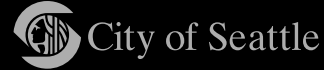


The Alaskan Way Viaduct & Seawall Replacement Project

06.05



Are Tsunamis a Threat to the Waterfront?

The potential threat of a tsunami in Puget Sound is an issue of concern to both citizens and the Washington State Department of Transportation (WSDOT) and City of Seattle. WSDOT and the City, in association with scientists and engineers, completed an investigation of the risk of tsunamis occurring in Elliott Bay. The investigation found that it is highly unlikely that a tsunami wave would overtop the proposed Seawall and enter the tunnel. Only a tsunami that occurs during high tide could potentially reach one foot higher than the Seawall. A tsunami meeting those conditions is estimated to occur once every 23,000 to 60,000 years. This makes the chances of a tsunami overtopping the Seawall extremely unlikely – 40 times less likely than a major earthquake and similar to the odds of a very large meteor striking the Earth.

For More Information:

Visit the Web site at:

[www.wsdot.wa.gov/
projects/viaduct](http://www.wsdot.wa.gov/projects/viaduct)

Call the hotline:

206-269-4421

Send an e-mail to:

viaduct@wsdot.wa.gov

Send a letter to:

Alaskan Way Viaduct and
Seawall Replacement Project
c/o Washington State
Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104

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What is a tsunami?

A tsunami is a series of traveling ocean waves created by large earthquakes and other disturbances in the ocean floor. In the deep ocean, these waves may only be a few feet high, but can reach speeds exceeding 500 miles an hour. As the waves approach the shore, the shallower water decreases the wave speed while the height of the wave increases – to as much as 50 feet.

What could cause a tsunami in the Seattle area?

Within the Puget Sound area of Washington, there are two sources of earthquake activity capable of producing tsunamis that could affect Seattle. The Cascadia Subduction Zone has significant earthquakes every 400 to 600 years, the last one in 1700. The Seattle Fault has large earthquakes every 2,000 to 6,000 years, most recently around 1,100 years ago.

For a tsunami to occur from either of these faults, there needs to be a sharp vertical movement of the ocean floor. Most earthquakes do not cause tsunamis. Of all known earthquakes on the Puget Sound faults over the past 6,000 years, only one has actually produced a tsunami.

Would a tsunami in Puget Sound be similar to the 2004 tsunami in the Indian Ocean?

No. The earthquake in the Indian Ocean caused a series of waves that reached heights of up to 50 feet. This is because there was a sharp vertical movement in the ocean floor in very deep water with plenty of room for the tsunami to generate large waves before it reached land. The two potential tsunami sources in the Seattle area – the Cascadia Subduction Zone and the Seattle Fault – would cause only 5 and 10-foot waves. A small basin such



as Elliott Bay or Puget Sound generates smaller waves than those created in the open ocean. Tsunamis created in the open ocean would dissipate as they traversed the Strait of Juan de Fuca and Admiralty Inlet. The waves would further dissipate due to the many twists and turns of Puget Sound on the way to Seattle.

Are the alternatives safe in a tsunami?

Yes. Both alternatives are being designed to withstand earthquakes likely to occur every 2,500 years—a significantly higher standard than has been used in the past for other highways and buildings. The designs for the Seawall are also based on assumptions about rising sea levels. In the event of a tsunami, there will be room between the uppermost points of high tide and the top of the Seawall.

How would a tsunami affect the tunnel?

The Cascadia Subduction Zone could generate a wave of up to 5 feet. This 5-foot wave, even at a high tide of 8 feet, would still be smaller than the 17-foot Seattle waterfront Seawall. No water would reach the tunnel. The

as the proposed tunnel. At most, a one-foot wave might overtop the Seawall and flood the base of a new aerial roadway; the Alaskan Way surface street would experience about a foot of flooding for a short period of time.

Source:

Tsunami Risk to Proposed Waterfront Tunnel in Seattle, Prepared by Parsons Brinckerhoff, 2005



Seattle Fault could create a wave up to 10 feet high, which would overtop the Seawall by about one foot only at high tide. Elliott Bay is at high tide only 10 to 13 percent of the time.

How would a tsunami affect the elevated structure?

If the Alaskan Way Viaduct were replaced with a new elevated structure, a refurbished Seawall of the same size as today would protect the structure. The replacement structure would face the same small risk of tsunami damage

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